

ABSTRACT OF THE DISCLOSURESignalling Method and Apparatus

5 At least one three phase driven pumps (56) in a hydrocarbon well  
(10) well bore (12) uses frequency shift keyed digital signals (78)  
to pass instructions from a surface station (46, 26, 34, 30) to a  
tool (14, 76, 56) and reports from a tool (14, 76, 56) to the  
10 surface station (46, 26, 34, 30) in common mode through the three  
phase cables (16) using a star point (58) of the three phase cables  
(16) after each pump as the signal transmission and reception point  
and as the point for coupling a DC Power supply (28), also provided  
in common mode on the three phase cables (16), to the down hole  
15 electronic equipment (72 76). The surface equipment (46) and the  
tool (14) use as a common ground. The digital messages comprises an  
address portion (80) identifying either the tool (14) for which an  
instruction (82) is destined or the tool (14) from which a report  
(also 82) originates. The digital message (18) also comprises a  
checksum (84) for error identification and correction.

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(Figure 1)